EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given by Jennifer M.K. Rogers, reg. no. 58,695 on June 2, 2008.

3. The application has been amended as follows:

a. Replace claim 1 to read as of the following,

In Claim 1,

Claim 1 (Currently Amended) A method for load-balancing subscriber sessions across a plurality of tunnel termination devices comprising:

receiving a network access request and user information from a subscriber device;

authenticating the user information with an access concentrator of a network service provider;

retrieving tunnel definitions associated with the user information received from the subscriber device, the tunnel definitions defining a plurality of preference levels, wherein each of

the plurality of preference levels specifies a different subset of the plurality of tunnel termination devices;

selecting a ~~first one~~ highest level of the plurality of preference levels defined by the tunnel definitions;

selecting one of the plurality of [[a]] tunnel termination devices associated with the highest level of the plurality of preference levels from the subset of the plurality of tunnel termination devices ~~specified by the first one of the preference levels~~ based on weightings associated with each of the plurality of tunnel termination devices ~~specified by the first preference level~~;

attempting to establish a network tunnel between the ~~selected~~ one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator;

upon failing to establish the network tunnel with the ~~selected~~ one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels:

determining whether a preference level failover setting is enabled;

when the preference level failover setting is enabled:

~~selecting a second one of the preference levels defined by the tunnel definitions;~~

~~selecting a tunnel termination device from the subset of the plurality of tunnel termination devices specified by the second preference level based on weightings associated with each of the plurality of tunnel termination devices of the second preference level; and~~

selecting another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices; and

establishing a network tunnel between the ~~selected~~ another one of the plurality of tunnel termination devices ~~specified by the second~~ associated with the highest level of the plurality of preference levels and the access concentrator;

when the preference level failover setting is not enabled:

selecting a next highest level of the plurality of preference levels defined by the tunnel definitions;

selecting one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels from the subset of the plurality of tunnel termination devices specified by the next highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels; and

establishing a network tunnel between the one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels and the access concentrator.

b. Replace claim 2 to read as of the following,

In Claim 2,

Claim 2 (Currently Amended) The method of claim 1, further comprising calculating the weightings associated with each of the plurality of tunnel termination devices based on a resource constraint associated with the each of the plurality of tunnel termination devices ~~specified by the user information for~~ associated with [[the]] a selected preference level.

c. Replace claim 3 to read as of the following,

In Claim 3,

Claim 3 (Currently Amended) The method of claim 2, wherein calculating the weightings comprises calculating the weightings associated with each of the plurality of tunnel termination devices based on a maximum number of the subscriber sessions supported by the each of the plurality of tunnel termination devices ~~specified by the user information for~~ associated with the selected preference level.

d. Replace claim 4 to read as of the following,

In Claim 4,

Claim 4 (Currently Amended) The method of claim 1, further comprising assigning the weightings associated with each of the plurality of tunnel termination devices to the plurality of tunnel termination devices based on user input.

e. Replace claim 5 to read as of the following,

In Claim 5,

Claim 5 (Currently Amended) The method of claim 1, further comprising:

issuing a query to receive the tunnel definitions;

calculating the weightings associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices of [[the]] a selected preference level; and

selecting the one of the plurality of tunnel termination devices of the selected preference level based on the ~~calculated~~ weightings associated with each of the plurality of tunnel termination devices calculated.

f. Replace claim 6 to read as of the following,

In Claim 6,

Claim 6 (Currently Amended) The method of claim 5, wherein calculating the weightings associated with each of the plurality of tunnel termination devices further comprises:

determining a maximum number of the subscriber sessions supported by the each of the plurality of tunnel termination devices of the selected preference level; and

calculating the weighting associated with each of the plurality of tunnel termination devices of the selected preference level as a function of the maximum number of the subscriber sessions supported by the each of the plurality of tunnel termination devices of the selected preference level.

g. Replace claim 7 to read as of the following,

In Claim 7,

Claim 7 (Currently Amended) The method of claim 1, wherein establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator comprises establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator in accordance with [[the]] a Layer Two Tunneling Protocol (L2TP).

h. Replace claim 8 to read as of the following,

In Claim 8,

Claim 8 (Currently Amended) The method of claim 1, wherein establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator comprises

establishing one of a Multiprotocol Label Switching (MPLS) tunnel, a Generic Routing Encapsulation (GRE) tunnel, and an IP Security (IPSEC) tunnel.

i. Replace claim 9 to read as of the following,

In Claim 9,

Claim 9 (Currently Amended) The method of claim 1, wherein establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator comprises establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator from an edge router to the ~~selected~~ one of the plurality of tunnel termination devices selected.

j. Replace claim 10 to read as of the following,

In Claim 10,

Claim 10 (Currently Amended) The method of claim 1,

wherein selecting the one of [[a]] the plurality of tunnel termination devices comprises selecting one of a plurality of Layer Two Tunneling Protocol (L2TP) Network Servers (LNSs) based on weightings associated with the LNSs, and

wherein establishing [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator comprises establishing an L2TP tunnel with the ~~selected~~ one of the plurality of LNSs selected.

k. Cancel claim 14,

Claim 14 (Canceled)

l. Replace claim 15 to read as of the following,

In Claim 15,

Claim 15 (Currently Amended) The method of claim 1 [[14]], further comprising:

~~wherein selecting a second preference level comprises updating the selected preference level to the second preference level upon failing to establish the network tunnel between the selected different one of the plurality of tunnel termination devices at the first preference level and the access concentrator and when the preference level fail-over option is disabled[[;]], further comprising:~~

calculating the weightings associated with each of the plurality of tunnel termination devices specified by the next highest level of the ~~second~~ plurality of preference levels based on resource constraints for [[the]] respective one of the plurality of tunnel termination devices,

wherein selecting the one of the plurality of tunnel termination devices associated with the next highest level of the ~~second~~ plurality of preference levels is based on the ~~calculated~~ weightings associated with each of the plurality of tunnel termination devices calculated.

m. Replace claim 19 to read as of the following,

In Claim 19,

Claim 19 (Currently Amended) A network device comprising:

one or more processors;

a connection handler executed by the processors to receive network access requests and user information from subscriber devices;

an authentication handler to authenticate the user information and to receive tunnel definitions associated with the user information received from the subscriber devices that defines a plurality of preference levels, wherein each of the plurality of preference levels specifies a subset of a plurality of tunnel termination devices;

a tunneling module executed by the processors to load balance subscriber sessions across [[a]] the subset of the plurality of tunnel termination devices at a ~~first~~ highest level of the plurality of preference levels based on a resource constraint associated with each of the subset of the plurality of tunnel termination devices,

wherein the tunneling module selects one of the plurality of [[a]] tunnel termination devices associated with the highest level of the plurality of ~~at a second~~ preference levels ~~when a network tunnel cannot be established with a tunnel termination device at the first preference level.~~ from the subset of the plurality of tunnel termination devices based on weightings associated with each of the plurality of tunnel termination devices,

and wherein the tunneling module attempts to establish a network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and an access concentrator of a network service provider;-

wherein upon the tunneling module failing to establish the network tunnel with the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels, the tunneling module determines whether a preference level failover setting is enabled;

wherein when the preference level failover setting is enabled:

the tunneling module selects another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices, and establishes a network tunnel between the another one of the plurality of

tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator;

wherein when the preference level failover setting is not enabled:

the tunneling module selects a next highest level of the plurality of preference levels defined by the tunnel definitions, selects one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels from the subset of the plurality of tunnel termination devices specified by the next highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels, and establishes a network tunnel between the one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels and the access concentrator.

n. Replace claim 20 to read as of the following,

In Claim 20,

Claim 20 (Currently Amended) The network device of claim 19, wherein the tunneling module load balances the subscriber sessions across the plurality of tunnel termination devices at the highest level of the plurality of ~~first~~ preference levels based on a maximum number of the subscriber sessions supported by the each of the plurality of tunnel termination devices at the ~~first~~ highest level of the plurality of preference levels.

o. Replace claim 21 to read as of the following,

In Claim 21,

Claim 21 (Currently Amended) The network device of claim 19, wherein the tunneling module assigns the weightings associated with each of the plurality of tunnel termination devices to the each of the plurality of tunnel termination devices at the highest level of the plurality of ~~first~~ preference levels, and selects the one of the plurality of tunnel termination devices at the highest level of the plurality of ~~first~~ preference levels as a destination for [[a]] the network tunnel between the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator of the network service provider in accordance with the ~~assigned~~ weightings associated with each of the plurality of tunnel termination devices assigned.

p. Replace claim 22 to read as of the following,

In Claim 22,

Claim 22 (Currently Amended) The network device of claim 21 wherein the tunneling module calculates the weightings based on a maximum number of subscriber sessions supported by each of the plurality of tunnel termination devices at the highest level of the plurality of ~~first~~ preference levels.

q. Replace claim 23 to read as of the following,

In Claim 23,

Claim 23 (Currently Amended) The network device of claim 19, wherein the tunneling module assigns the weighting associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices at the highest level of the plurality of ~~first~~ preference levels based on user input.

r. Replace claim 24 to read as of the following,

In Claim 24,

Claim 24 (Currently Amended) The network device of claim 19, further comprising:

an authorization manager that generates data identifying [[a]] the plurality of tunnel termination devices and associating the plurality of tunnel termination devices with the plurality of preference levels based on the user information received from the subscriber devices,

wherein the tunneling module load balances the subscriber sessions across the plurality of tunnel termination devices in accordance with the ~~associated~~ plurality of preference levels associated.

s. Replace claim 25 to read as of the following,

In Claim 25,

Claim 25 (Currently Amended) The network device of claim 24, wherein the tunneling module identifies [[a]] the subset of the plurality of tunnel termination devices associated with a current one of the ~~subscriber~~ plurality of preference levels, calculates the weightings associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices of the subset of the plurality of tunnel termination devices identified ~~subset~~, and selects one of the plurality of tunnel termination devices of the subset of the plurality of tunnel termination devices identified ~~subset~~ based on the ~~calculated~~ weightings associated with each of the plurality of tunnel termination devices calculated.

t. Replace claim 26 to read as of the following,

In Claim 26,

Claim 26 (Currently Amended) The network device of claim 19, wherein the tunneling module establishes network tunnels with the plurality of tunnel termination devices in accordance with [[the]] a Layer Two Tunneling Protocol (L2TP).

u. Replace claim 27 to read as of the following,

In Claim 27,

Claim 27 (Currently Amended) The network device of claim 19, wherein the tunneling module establishes network tunnels with the plurality of tunnel termination devices in accordance with one of [[the]] Multiprotocol Label Switching (MPLS) protocol, [[the]] Generic Routing Encapsulation (GRE) protocol, and [[the]] IP Security (IPSEC) protocol.

v. Replace claim 29 to read as of the following,

In Claim 29,

Claim 29 (Currently Amended) The network device of claim 19, wherein the network device comprises a Layer Two Tunneling Protocol (L2TP) Access Concentrator (LAC), and the plurality of tunnel termination devices comprise L2TP Network Servers (LNSs).

w. Replace claim 30 to read as of the following,

In Claim 30,

Claim 30 (Currently Amended) A computer-readable ~~storage~~ medium comprising instructions to cause a processor to:

receive a network access request and user information from a subscriber device;

authenticate the user information with an access concentrator of a network service provider;

receive tunnel definitions associated with the user information received from the subscriber device that define a plurality of preference levels, wherein each of the plurality of preference levels specifies a subset of a plurality of tunnel termination devices;

select a highest level of the plurality of ~~first~~ preference levels based on the user information;

select one of the plurality of tunnel termination devices associated with the highest level of the plurality of ~~at the~~ ~~first~~ preference levels based on weightings associated with each of the plurality of tunnel termination devices ~~at the first preference level~~;

attempt to establish a network tunnel between the access concentrator and the ~~selected~~ one of the plurality of tunnel termination devices associated with the highest level of the plurality of ~~at the~~ ~~first~~ preference levels;

upon failing to establish the network tunnel,

~~select a second preference level based on the user information;~~
~~select one of a plurality of tunnel termination devices at the second preference level based on weightings associated with each of the plurality of tunnel termination devices at the second preference level; and~~

~~attempt to establish a network tunnel between the selected one of the plurality of tunnel termination devices at the second preference level and the access concentrator.~~

determining whether preference level failover is enabled;

when the preference level failover is enabled:

selecting another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices; and

establishing a network tunnel between the another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator;

when the preference level failover is not enabled:

select a next highest level of the plurality of preference levels based on the user information;

select one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels from the subset of the plurality of tunnel termination devices specified by the next highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices; and

establish a network tunnel between the one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels and the access concentrator.

x. Replace claim 31 to read as of the following,

In Claim 31,

Claim 31 (Currently Amended) The computer-readable medium of claim 30, further comprising instructions to cause the processor to calculate the weightings associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices at a selected preference level based on resource constraints associated with the each of the plurality of tunnel termination devices at the selected preference level.

y. Replace claim 32 to read as of the following,

In Claim 32,

Claim 32 (Currently Amended) The computer-readable medium of claim 31, further comprising instructions to cause the processor to calculate the weightings associated with each of

the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices at [[a]] the selected preference level based on a maximum number of subscriber sessions supported by the each of the plurality of tunnel termination devices at the selected preference level.

z. Replace claim 33 to read as of the following,

In Claim 33,

Claim 33 (Currently Amended) The computer-readable medium of claim 30, further comprising instructions to cause the processor to assign the weighting associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices based on user input.

aa. Replace claim 34 to read as of the following,

In Claim 34,

Claim 34 (Currently Amended) The computer-readable medium of claim 30, further comprising instructions to cause the processor to:

issue a query to receive the tunnel definitions;

calculate the weightings associated with each of the plurality of tunnel termination devices for the each of the plurality of tunnel termination devices of [[the]] a selected preference level; and

select one of the plurality of tunnel termination devices of the selected preference level based on the ~~calculated~~ weightings associated with each of the plurality of tunnel termination devices calculated.

bb. Replace claim 35 to read as of the following,

In Claim 35,

Claim 35 (Currently Amended) The computer-readable medium of claim 34, further comprising instructions to cause the processor to:

determine a maximum number of subscriber sessions supported by the each of the plurality of tunnel termination devices of the selected preference level; and

calculate the weighting associated with each of the plurality of tunnel termination devices of the selected preference level as a function of the maximum number of the subscriber sessions supported by the each of the plurality of tunnel termination devices of the selected preference level.

cc. Replace claim 36 to read as of the following,

In Claim 36,

Claim 36 (Currently Amended) The computer-readable medium of claim 30, wherein the instructions cause the processor to establish [[a]] the network tunnel between the access concentrator and the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels in accordance with [[the]] a Layer Two Tunneling Protocol (L2TP).

dd. Replace claim 37 to read as of the following,

In Claim 37,

Claim 37 (Original) The computer-readable medium of claim 30, further wherein the instructions cause the processor to establish one of a Multiprotocol Label Switching (MPLS) tunnel, a Generic Routing Encapsulation (GRE) tunnel, and an IP Security (IPSEC) tunnel.

ee. Replace claim 38 to read as of the following,

In Claim 38,

Claim 38 (Currently Amended) The computer-readable medium of claim 30, wherein the instructions cause the processor to establish [[a]] the network tunnel between the access concentrator and the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels from an edge router to the ~~selected~~ one of the plurality of tunnel termination devices selected.

ff. Replace claim 39 to read as of the following,

In Claim 39,

Claim 39 (Currently Amended) A system comprising:

a subscriber device; and

an Internet Service Provider (ISP) comprising:

a Layer Two Tunneling Protocol (L2TP) Access Concentrator (LAC), and

a plurality of L2TP Network Servers (LNSs),

wherein the LAC receives a network access request and user information from the subscriber device, authenticates the user information, receives tunnel definitions associated with the user information received from the subscriber device that define a plurality of preference levels, wherein each of the plurality of preference levels specifies a different subset of the plurality of LNSs,

wherein the LAC selects a highest level of the plurality of ~~first~~ preference levels based on the user information, applies a weighted load-balancing process to select one of the plurality of LNSs within the subset of the plurality of LNSs specified by the highest level of the plurality of ~~first~~ preference levels, and attempts to establish an L2TP tunnel associated with the subscriber device with the ~~selected~~ one of the plurality of LNSs selected at the highest level of the plurality of ~~first~~ preference levels, and

~~wherein, upon failing to establish an L2TP tunnel with the selected one of the LNSs at the first preference level, the LAC selects a second preference level and applies a weighted load-balancing process to select one of the LNSs within the subset of the LNSs specified by the second preference level and attempts to establish an L2TP tunnel associated with the subscriber device with the selected one of the LNSs at the second preference level.~~

wherein, upon failing to establish the L2TP tunnel with the one of the plurality of LNSs associated with the highest level of the plurality of preference levels, the LAC determines whether a preference level failover setting is enabled;

wherein when the preference level failover setting is enabled:

the LAC selects another one of the plurality of LNSs associated with the highest level of the plurality of preference levels based on weightings associated with each of the plurality of LNSs of the highest level of the plurality of preference levels, and establishes an L2TP tunnel between the another one of the plurality of LNSs associated with the highest level of the plurality of preference levels and the LAC;

wherein when the preference level failover setting is not enabled:

the LAC selects a next highest level of the plurality of preference levels and applies the weighted load-balancing process to select one of the plurality of LNSs associated with the next highest level of the plurality of preference levels based on the weightings associated with each of the plurality of LNSs associated with the next highest level of the plurality of preference levels and attempts to establish an L2TP tunnel associated with the subscriber device with the one of the plurality of LNSs selected at the next highest level of the plurality of preference levels.

gg. Replace claim 40 to read as of the following,

In Claim 40,

Claim 40 (Currently Amended) The system of claim 39, wherein the LAC applies the weighted load-balancing process by calculating the weightings associated with each of the plurality of LNSs for the each of the plurality of LNSs at [[the]] a selected preference level based on resource constraints associated with the each of the plurality of LNSs at the selected preference level.

hh. Replace claim 41 to read as of the following,

In Claim 41,

Claim 41 (Currently Amended) The system of claim 40, wherein the LAC calculates the weightings associated with each of the plurality of LNSs based on a maximum number of subscriber sessions supported by the each of the plurality of LNSs at the selected preference level.

ii. Replace claim 42 to read as of the following,

In Claim 42,

Claim 42 (Currently Amended) The system of claim 39, wherein the LAC applies the weighted load-balancing process by assigning weightings associated with each of the plurality of LNSs to the each of the plurality of LNSs at [[the]] a selected preference level based on user input.

jj. Replace claim 43 to read as of the following,

In Claim 43,

Claim 43 (Currently Amended) The method of claim 1, further comprising, upon establishing the network tunnel between the ~~selected one of the plurality of tunnel termination devices specified by the second preference level and the access concentrator, establishing a subscriber session associated with the subscriber device over the network tunnel~~ one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels and the access concentrator, establishing a subscriber session associated with the subscriber device over the network tunnel between the one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels and the access concentrator.

Reason for Allowance

4. The following is an examiner's statement of reasons for allowance: None of the prior art of records teach or suggest in combination a method comprising: wherein upon the failing to establish the network tunnel with the one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels, determines whether a

preference level failover setting is enabled; wherein when the preference level failover setting is enabled: selects another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices, and establishes a network tunnel between the another one of the plurality of tunnel termination devices associated with the highest level of the plurality of preference levels and the access concentrator; wherein when the preference level failover setting is not enabled: selects a next highest level of the plurality of preference levels defined by the tunnel definitions, selects one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels based on the weightings associated with each of the plurality of tunnel termination devices, and establishes a network tunnel with the one of the plurality of tunnel termination devices associated with the next highest level of the plurality of preference levels.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip C Lee whose telephone number is (571)272-3967. The examiner can normally be reached on 8 AM TO 5:30 PM Monday to Thursday and every other Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on (571) 272-3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Philip C Lee/

Patent Examiner, Art Unit 2152